

Yasuharu Suda and Hiroaki Kuno  
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Filed: March 16, 2000  
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**In the Claims**

Please amend claims 21, 22 and 24 as marked-up in **Exhibit A** attached hereto, by deleting the bracketed matter and inserting the underlined matter. Please add new claim 28. A clean copy of claims 21, 22 and 24, as amended, and new claim 28 is attached as **Exhibit B**.

**REMARKS**

Claims 21-27 were pending in the subject application. Applicants have hereinabove added new dependent claim 28 and amended claims 21, 22 and 24. Accordingly, claims 21-28 are presented for examination.

Claims 21, 22 and 24 have been amended to place the claims in better form for examination, without narrowing the scope of the claimed invention.

Applicants maintain that no new matter is presented by this amendment. Accordingly, Applicants respectfully request that this Amendment be entered.

**Objection To The Claims**

On Page 2 of the April 17, 2002 Office Action, the Examiner objected to claim 22.

The Examiner stated that the Markush group in claim 22 mixes commas and semicolons for separating species. The Examiner further stated that the claim should be consistent in its use of these punctuation marks. The Examiner also stated that correction is required.

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In response, without conceding the correctness of the Examiner's position, but solely to advance prosecution of the subject application, Applicants have amended claim 22 hereinabove.

Accordingly, Applicants respectfully request that the Examiner withdraw the objection to claim 22.

**Rejection under 35 U.S.C. §112, first paragraph**

On page 2 of the April 17, 2002 Office Action, claims 21-27 were rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The Examiner stated that the claims have been amended to specify that heating of the recited resin and solvent occurs "while performing stirring after dispersing and mixing said thermoplastic resin in said solvent, to dissolve said resin in said solvent; ...". The Examiner further stated that Applicants assert that basis for this amendment is found in Example 1. The Examiner also stated that while the example does disclose a step of heating while stirring, this example only discloses this combination of steps when the inorganic particle, mixed solvent, colorant, and resin are present together during the heating and stirring. The Examiner further stated that there is no disclosure of heating and stirring the resin without the inorganic particles as permitted by the instant claims.

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In response, without conceding the correctness of the Examiner's position but solely to advance the prosecution of the subject application, Applicants have hereinabove amended the claims. Applicants maintain that the claim amendments do not narrow the scope of the claim, but rather place the claims in better form for examination.

As described in amended claim 21, the inorganic particles are heated, while being stirred in an SP value-adjusted solvent together with a coloring agent subjected to dispersion and mixing. It should be noted that "coloring agent subjected to dispersion and mixing" has support from, for example, embodiment 1 disclosed in the original specification, and therefore does not introduce new matter. Applicants maintain that the claimed invention as set forth in the amended claims is fully supported by the specification as originally filed.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 21-27 under 35 U.S.C. §112, first paragraph.

**Rejection under 35 U.S.C. §112, second paragraph**

On page 3 of the April 17, 2002 Office Action, claims 21-27 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner stated that the claims, even as amended, are indefinite because it remains unclear if the dispersing and

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mixing steps are actually required steps in the process. The Examiner also stated that the process only recites these steps in reference to the timing of the heating while performing stirring step, but they are not positively recited as occurring in the process.

In response, without conceding the correctness of the Examiner's position but solely to advance the prosecution of the subject application, Applicants have hereinabove amended the claims. Applicants respectfully submit that the amended claims clearly recite the subject matter Applicants regard to be the invention.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 21-27 under 35 U.S.C. §112, second paragraph.

**Rejection Under 35 U.S.C. §103(a)**

On page 3 of the April 17, 2002 Office Action, claims 21-24 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,358,822 to Hou (hereinafter "Hou '822").

The Examiner stated that Hou '822 discloses a process of making a liquid toner in the process of Example 2. The Examiner further stated that in the process a thermoplastic polymer and a pigment (e.g., carbon black - an inorganic pigment) are placed in a solvent that is a good solvent for the polymer at high temperatures and a poor solvent at lower temperatures. The Examiner also stated that the polymer and pigment are

sonified and heated to a temperature where the polymer is dissolved and then cooled so the polymer precipitates with the pigment. The Examiner further stated that the precipitated polymer particles are removed from the solvent and the redispersed in ISOPAR and mixed with cupric naphthenate along with a steric stabilizer.

The Examiner stated that Applicants discuss the rejection in the response and then identify reasons why they believe Hou '822 does not suggest the claimed invention. The Examiner further stated that Applicants are understood to state that, although the concept of SP values with respect to solvents or a resin in a solvent are known in the art, the reference fails to disclose that the particle diameter can be determined by choice of SP values of the resin and the solvent.

The Examiner stated that Hou '822 discloses an ethanol solvent and a thermoplastic resin that are mixed and heated in the presence of an inorganic fine particle. The Examiner further stated that the resin and the solvent each have an SP value. The Examiner also stated that Applicants are not understood to have asserted otherwise. The Examiner further stated that in the process of Hou '822 the inherent SP values of the resin and the solvent would contribute to the final characteristics of the polymer-encapsulated pigment toner particles recovered after the mixture was cooled. The Examiner stated that it is not necessary for the reference to teach that the particle size of the toner particle can be controlled by choice of SP values because in the process each of the resin and the solvent have an SP value that inherently contributes to the characteristics

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of the recovered particles.

The Examiner stated that if Applicants are taking the position that the limitation of the "SP value of the solvent being adjusted" refers to a manipulative step during the heating step they are asked to clarify in the response. The Examiner further stated that this step is understood to refer to the characteristics of the solvent combined with the resin and that the solvent SP is not changed other than any inherent change that could occur during the heating step. The Examiner stated that clarification may prove helpful.

The Examiner stated that Applicants state in the response that the step of forming resin particles and the step of combining fine resin particles and inorganic fine particles are executed not separately from each other but simultaneously. The Examiner further stated that the instant claims do not require simultaneous events as stated. The Examiner also stated that in example 1 of the instant specification the fine resin particles and the inorganic fine particles are mixed together before any steps of particle formation. The Examiner further stated that it is unclear how these remarks relate to the instant claims and specification. The Examiner requested clarification.

The Examiner stated that the resin and solvent in Hou '822 must inherently have a solubility parameter. The Examiner further stated that the size of the precipitated particles for the liquid toner in Hou '822 would be a result of the solubility parameters of the solvent and resin and other process

conditions, such as heating, mixing, and cooling characteristics. The Examiner alleged that the skilled artisan would understand that the process variables, including SP, control the size, shape, and other characteristics of the particles.

Applicants maintain that Hou '822 does not render obvious the invention claimed in claims 21-24. The claimed invention is patentable over Hou '822 for at least the following reasons.

Independent claim 21, as amended, relates to a method of manufacturing a liquid toner composition for electrophotography. The method comprises heating a thermoplastic resin within a solvent capable of dissolving the thermoplastic resin when heated and substantially incapable of dissolving the resin at room temperature, an SP (solubility parameter) value of the solvent being adjusted to control the particle diameter of toner particles on a basis of a difference between an SP value of the resin and the SP value of the solvent, while stirring the thermoplastic resin in the solvent together with inorganic particles and a coloring agent subjected to dispersion and mixing, to thereby dissolve the thermoplastic resin in the solvent; and cooling the mixture to permit precipitation of the toner particles.

Therefore, claim 21 includes the following features: (i) a thermoplastic resin is dissolved by heating it while stirring in a specific solvent together with inorganic particles and a coloring agent subjected to dispersion and mixing, and the resultant mixture is then cooled to precipitate toner

particles; and (ii) the specific solvent is a solvent capable of dissolving the thermoplastic resin when heated and substantially incapable of dissolving the resin at room temperature. The SP (solubility parameter) value of the solvent is adjusted in such a manner that the diameter of toner particles can be controlled on the basis of the difference between the SP values of the resin and solvent.

The claimed invention embodies the recognition that the diameter of toner particles can be controlled based on the difference between the SP values of a resin and a specific solvent when a mixture of the solvent and the thermoplastic resin is cooled to allow precipitation of the toner particles.

Hou '822 does not disclose or suggest that a polymer is insoluble in a solvent at room temperature. Since the polymer is precipitated by decreasing the temperature to 0°C, it is conceivable that the polymer of Hou dissolves in a solvent at room temperature. It may be possible for those skilled in the art to select an appropriate combination of a resin and a solvent in which the resin does not dissolve in the solvent at room temperature and begins to dissolve at a higher temperature. However, selecting such a combination does not necessarily lead to sharp toner particles whose average diameter is in the range of 2 to 3  $\mu\text{m}$ . In other words, such sharp toner particles cannot be precipitated without the technical concepts of SP values described in the subject application.

According to the invention described in the subject



application, a thermoplastic resin is dissolved by heating it while stirring it in a specific solvent together with inorganic particles and a coloring agent subjected to dispersion and mixing. The resultant mixture is then cooled to precipitate toner particles. Thus, the liquid toner is allowed to have characteristics similar to those of an electrotheological fluid, and the liquid toner composition using that liquid toner ensures high (or stable) image quality. These advantages of the claimed invention are not disclosed or suggested in Hou '822.

Claim 21 of the present application describes "an SP value of said solvent being adjusted". It should be noted that this adjustment is made before starting the heating process. In addition, the SP values of the solvent and resin may vary slightly in accordance with an increase in the temperature during the heating process.

Since an SP value is a value determined by the molecular structure of a resin or a solvent, the resin and solvent disclosed in Hou '822 have SP values, as pointed out by the Examiner. Assuming that the resin of Hou '822 is dissolved in the solvent of the reference by heating, and that the resultant mixture is then cooled to produce minute particles, the SP value difference between the resin and the solvent may be a factor that determines the diameters of the particles. However, Hou '822 does not disclose or suggest that the SP value difference between a resin and a solvent is a factor for determining the diameters of resin particles precipitated in the solvent. Hou '822 simply does not suggest that the

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difference between the SP value of the resin and that of the solvent is effective in controlling diameters of precipitated particles.

The diameters of precipitated resin particles can be controlled by using solvents of different SP values, i.e., without having to use different kinds of resin or varying the manufacturing conditions. The type of resin and solvent in use should be selected, of course, in a manner that the resin would not dissolve at room temperature and can dissolve at a higher temperature. This technique of controlling the diameters of resin particles is not disclosed or suggested by Hou '822.

Therefore, Hou '822 fails to teach or render obvious all features of the claimed invention.

Regarding claims 22-24, Applicants respectfully point out that claims 22-24 depend on and include all the limitations of claim 21. Thus, claims 22-24 are patentable at least for the reasons set forth above with respect to claim 21.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 21-24 under 35 U.S.C. §103.

**Rejection Under 35 U.S.C. §103(a)**

On page 5 of the April 17, 2002 Office Action, claims 25-27 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Hou '822 and further in view of U.S. Patent

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No. 3,808,026 to Sato et al. (hereinafter "Sato '026").

The Examiner alleged that substituting the white pigment of Sato '026 for the colorant in Hou '822 toner purportedly would have been obvious to provide development of the image background. The Examiner stated that the development of the background area on the photoreceptors permits neutralization of background charges and allows clear images to be formed. The Examiner alleged that there is ample motivation for the combination of Sato '026 particles into the process and toner of Hou '822.

The Examiner stated that Hou '822 suggests the characteristics of heating while performing stirring of the resin and inorganic particles in a solvent, each of the resin and the solvent in Hou '822 having an SP that contributes to the properties of the produced toner.

Applicants maintain that Hou '822 and Sato '026 do not render obvious the claimed invention. The claimed invention is patentable over Hou '822 and Sato '026 for at least the following reasons.

Claims 25-27 depends on claim 21, and therefore includes all the features of claim 21.

As discussed hereinabove, Hou '822 fails to disclose or suggest, for example, adjusting the SP value of the solvent to control the particle diameter of toner particles on the basis

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of a difference between and SP value of the resin and the SP value of the solvent, as provided by the invention claimed in claim 21. Sato '026 does not cure the deficiencies of Hou '822.

Sato '026 relates to a method of developing an electrostatic latent image formed on an electrophotographic surface.

Sato '026, like Hou '822, does not teach or suggest adjusting the SP value of the solvent to control the particles diameter of toner particles on the basis of a difference between and SP value of the resin and the SP value of the solvent, as provided by the claimed invention.

Therefore, even a combination of Hou '822 and Sato '026 fails to teach or render obvious all features of the claimed invention.

Accordingly, Applicants respectfully requests that the Examiner reconsider and withdraw the rejection of claims 25-27 under 35 U.S.C. §103.

In view of the amendments to the claims and remarks hereinabove, Applicants maintain that claims 21-28 are now in condition for allowance. Accordingly, Applicants earnestly solicit the allowance of claims 21-28.

If a telephone interview would be of assistance in advancing prosecution of the subject application, Applicants' undersigned

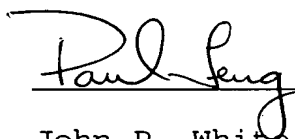
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attorney invites the Examiner to telephone him at the telephone number provided below.

If a petition for a further extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

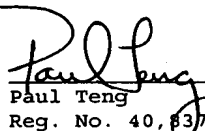
No fee, other than the \$110.00 fee for a one-month extension of time and the \$740.00 RCE filing fee, is deemed necessary in connection with the filing of this Amendment. However, if any additional fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 03-3125.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited this date with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Box RCE, Washington, D.C. 20231.

 August 16, 2002  
Paul Teng Date  
Reg. No. 40,837



21. (Thrice Amended) A method of manufacturing a liquid toner composition for electrophotography, comprising [the steps of]:

heating a thermoplastic resin within a solvent capable of dissolving said thermoplastic resin when heated and substantially incapable of dissolving said resin at room temperature, an SP (solubility parameter) value of said solvent being adjusted to control the particle diameter of toner particles on a basis of a difference between an SP value of the resin and the SP value of the solvent, while [performing] stirring [after dispersing and mixing said] the thermoplastic resin in said solvent together with inorganic particles and a coloring agent subjected to dispersion and mixing, to thereby dissolve said thermoplastic resin in said solvent; and

cooling the mixture to permit precipitation of the toner particles [, wherein inorganic fine particles are added to the mixture before initiation of the toner particle precipitation].

22. (Twice Amended) A method of manufacturing a liquid toner composition for electrophotography, according to claim 21, wherein said liquid toner composition [contains at least one of a dispersant and] includes one or more antistats selected from the group consisting of nigrosine series dyes, [manganese naphthenate, calcium naphthenate, zirconium naphthenate, cobalt naphthenate, iron naphthenate, lead naphthenate, nickel naphthenate, chromium naphthenate, zinc naphthenate, magnesium naphthenate, manganese octylate, calcium octylate, zirconium octylate, iron octylate, lead octylate, cobalt octylate, chromium octylate, zinc octylate, magnesium octylate, manganese

dodecylate, calcium dodecylate, zirconium dodecylate, iron dodecylate, lead dodecylate, cobalt dodecylate, nickel dodecylate, chromium dodecylate, zinc dodecylate and magnesium dodecylate; calcium dodecylbenzene sulphonate, sodium dodecylbenzene sulphonate, barium dodecylbenzene sulphonate; lecithin and cephalin; and n-decyl amine] metal soaps, alkylbenzene sulphonates, phospholipids and organic amines.

24. (Amended) The method of manufacturing a liquid toner composition for electrophotography according to claim 22, wherein said liquid toner composition includes a dispersant, and said dispersant is added in an amount of 0.5 to 80% by weight based on the solid components of the liquid toner composition.

28. (New) A method of manufacturing a liquid toner composition for electrophotography, according to claim 22, wherein

said metal soaps are selected from the group consisting of manganese naphthenate, calcium naphthenate, zirconium naphthenate, cobalt naphthenate, iron naphthenate, lead naphthenate, nickel naphthenate, chromium naphthenate, zinc naphthenate, magnesium naphthenate, manganese octylate, calcium octylate, zirconium octylate, iron octylate, lead octylate, cobalt octylate, chromium octylate, zinc octylate, magnesium octylate, manganese dodecylate, calcium dodecylate, zirconium dodecylate, iron dodecylate, lead dodecylate, cobalt dodecylate, nickel dodecylate, chromium dodecylate, zinc dodecylate and magnesium dodecylate;

said alkylbenzene sulphonate are selected from the group



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consisting of calcium dodecylbenzene sulphonate, sodium  
dodecylbenzene sulphonate, and barium dodecylbenzene sulphonate;  
said phospholipids are selected from the group consisting  
of lecithin and cephalin; and  
said organic amines are n-decylamine.